METHODS REPORTED FROM THE ZOOLOGICAL LABORATORY, UNIVERSITY OF WISCONSIN

Potash Clearing Method.—The potash clearing method is of great value in demonstrating skeletal structures without the removal of overlying tissues, and also in showing the relations of unossified bone as in the tarsus of amphibians.

The animal or part should be skinned and while fresh put into a 1% solution of KOH for about 12-24 hrs., or until internal structures are visible. The tissue is then removed to pure glycerine where it may be kept indefinitely. Animals as large as adult bullfrogs have been successfully cleared in this laboratory.

Substitute for Spalteholtz Clearing Method.—The expense connected with the Spalteholtz clearing method makes it prohibitive for general class use. A good substitute consists in the use of benzaldehyde as the clearing agent. The tissue after injection or other treatment is dehydrated in alcohol as far as 95%, and then removed to benzaldehyde and the container at once sealed. Benzaldehyde is very unstable, oxidizing in the air to form benzoic acid, hence it must not be exposed to the air. Specimens cleared in it must be carefully sealed.

Clearing and Mounting Hydra.—Some difficulty is encountered in clearing Hydra in xylol after dehydration in alcohol since the tissue becomes too brittle to be easily handled. This is especially true in making mounts of Hydra to show the developed ovaries and spermaries, which often drop off during the process. We have found that with rapid dehydration in the alcohols, followed by clearing in wintergreen oil this excess brittleness may be avoided. Mounts of Hydra bearing six or more spermaries and a well developed ovary have been made without difficulty, mounting in balsam in the usual way.

Injection of Semicircular Canals.—In using the semicircular canals of the shark for demonstration in elementary courses, where the entire head is immersed in a specimen jar, we find that students have much difficulty in making out the canals and ampullæ. By injecting these with India ink, introduced with a fine pipette the structures are made plainly visible. The ink will remain in

the canals if the specimen is given ordinary care after sealing in a specimen jar.

Ciliated Epithelium for Histological Study.—Students of histology often find it hard to obtain permanent slides of ciliated epithelium which show the separate cilia satisfactorily. There is a great tendency for these structures to matt down in a confused mass during fixation. I have had very good success using the sheath of the crystalline style of the fresh water mussel *(Anodonta* or *Unio)* and fixing in Bouin's fluid. After opening the animal from the right side cut through the stomach wall and, beginning at the opening of the intestine, slit it open for several centimeters. This will reveal the two typhlosoles with the style sac between them. Carefully free these structures, for a short distance, from the underlying tissues and place in a vial with the ciliated surface uppermost. Keeping the tissues as flat as possible, without pressing the ciliated side, run in enough of the Bouin's fluid to cover fully, and fix 12-24 hrs. Run up through the alcohols as usual. I find that sections cut 5μ and stained in iron hæmatoxylin, and counterstained with any acid carmine stain give the best results.

Preparation of Chick Embryos for Demonstration.—Students show much interest in the living chick embryo, especially when its heart is visible. The following method may be used to prepare them so that they may be watched for several days. The egg is taken from the incubator at the stage desired and placed in a bed of warm cotton. With a small compass a circle of the desired size is drawn on the shell, and this is then scored with a safety razor blade. With a pair of small scissors follow this scored line cutting just deeply enough to get through the shell. Lift off the circular piece of shell, drain off a little of the thinner albumen, and place over the opening a thin sheet of celloidin, cementing it fast with a solution of celloidin in ether.

This dries very rapidly, and as soon as the edge of the membrane is fast turn the egg over so that the embryo will float up against the shell on the opposite side of the egg until the membrane finishes drying. Keep the egg in a small incubator with a glass top, and provide abundant moisture to prevent the embryo from drying against the membrane.

The sheet of celloidin is easily made by pouring a thin layer of celloidin in alcohol and ether on a clean glass plate.

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EVIDENCE AS TO THE NUMBER OF SEGMENTS IN THE HEAD OF INSECTS

Students of insects estimate the number of somites entering into the insect head variously from one to nine. It appears to the writer that the number of muscle units in the mass of neck muscles may have some bearing on this question. The accompanying section (Plate V, figure 8) shows the condition in the neck of the tussock moth. Here we find five pairs of superimposed muscle bundles extending into the head. This fact perhaps strengthens the view that the five pairs of modified appendages about the head stand for so many segments. This muscular arrangement is quite generally found in insects.

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ANIMAL MICROLOGY

This well known book, now also well used for ten years, has recently been reissued in an enlarged second edition. The new volume represents a 20% increase over the original. The plan of the first edition has been maintained. This consists of a series of chapters dealing with the steps necessary in handling various kinds of animal materials; the reason for taking these steps in the way suggested; the points where difficulties are most likely to be encountered and the way to avoid these; and thus the means of discovering and remedying defective results.

In appendices are given an elementary treatment of the microscope and the principles of its making and use; a record of the formulæ for the making of the most used reagents, and suggestions for using them; a table of the tissues and organs of animals, and the most accepted method of killing, fixing, hardening, sectioning, staining, and other technic if any; a brief description of the methods peculiarly suitable to various groups of animals; and finally tables of weights and measures, and equivalents.